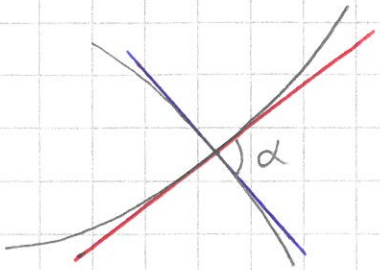
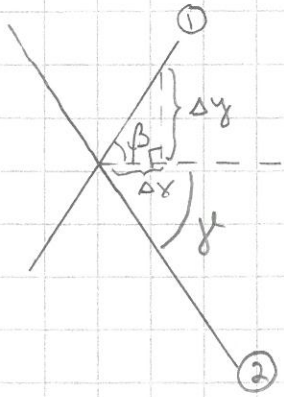
Ilmon. Käyrien leikkauskulma = leikkauspisteen piirrettyjen tangenttien välinen kulma





$$\begin{cases} \tan\beta = \frac{\Delta y}{\Delta x} = k_1 \\ \text{Vastaavasti } \tan\gamma = k_2 \end{cases}$$

$$\Rightarrow \alpha = \beta + \gamma$$

7.13 $\begin{cases} y = -\frac{1}{2}x^2 + 3 = f(x) \\ y = \frac{1}{4}x^2 + \frac{3}{2}x + 3 = g(x) \end{cases}$

leikkauspisteet: $f(x) = g(x) \Leftrightarrow -\frac{1}{2}x^2 + 3 = \frac{1}{4}x^2 + \frac{3}{2}x + 3 \quad | \cdot 4$

$\Leftrightarrow -2x^2 + 12 = x^2 + 6x + 12$

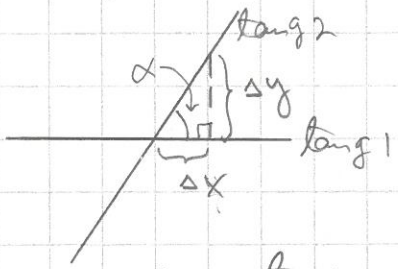
$\Leftrightarrow 0 = 3x^2 + 6x$

$\Leftrightarrow 3x(x+2) = 0 \Leftrightarrow x = \begin{cases} 0 \\ -2 \end{cases}$

$f'(x) = -x$, $g'(x) = \frac{1}{2}x + \frac{3}{2}$

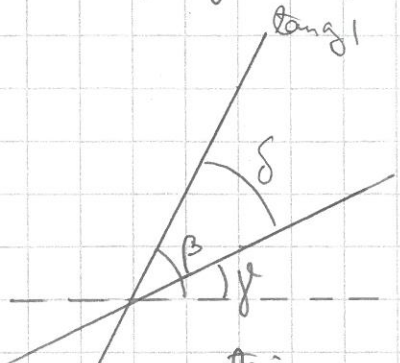
1° $x = 0$ $\quad k_{t1} = f'(0) = 0$ (tangentti x-akselin suuntainen)

$k_{t2} = g'(0) = \frac{1}{2}\cdot 0 + \frac{3}{2} = \frac{3}{2} = \tan\alpha \Rightarrow \alpha \approx 56^\circ$



2° $x = -2$ $\quad k_{t1} = f'(-2) = -(-2) = 2 = \tan\beta \Rightarrow \beta \approx 63{,}43^\circ$

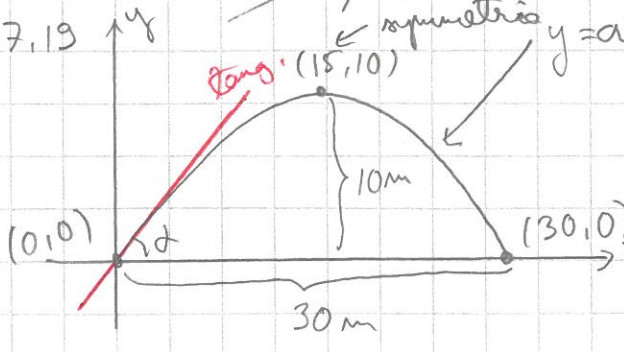
$k_{t2} = g'(-2) = \frac{1}{2}\cdot(-2) + \frac{3}{2} = \frac{1}{2} = \tan\gamma \Rightarrow \gamma \approx 26{,}57^\circ$



$\delta = \beta - \gamma \approx 63{,}43^\circ - 26{,}57^\circ$

$= 36{,}87^\circ \approx 37^\circ$

7.19



← symmetria $\quad y = ax^2 + bx + c$

3 tuntematonta → tarvitaan 3 yhtälöä

$$(0,0): \begin{cases} 0 = c \\ 0 = a\cdot 30^2 + b\cdot 30 + c \\ 10 = a\cdot 15^2 + b\cdot 15 + c \end{cases} \quad (30,0): \quad (15,10):$$